

Math 724: Problem Set 4

Due on 10.5.06

1. Show that $\mathbb{C}^n \otimes \mathbb{C}^m \cong \mathbb{C}^{nm}$ by displaying a map and proving the map is an isomorphism.
2. Show that, if $A \rightarrow B \rightarrow C \rightarrow 0$ is an exact sequence, then

$$0 \rightarrow \operatorname{hom}_R(C, N) \rightarrow \operatorname{hom}_R(B, N) \rightarrow \operatorname{hom}_R(A, N)$$

is also exact.

3. Prove that $\operatorname{hom}_R(\oplus_i M_i, N) = \prod_i \operatorname{hom}_R(M_i, N)$ by exhibiting a map and proving it's an isomorphism. We did part of this in class.
4. Exercise 2.9.
5. Exercise 3.1 on p. 109. We pretty much did this in class.
6. Exercise 3.4 on p. 109. Note that some helpful hints can be found in the back of the book.
7. (Extra Fun/Credit) Exercise 2.21a